Activity: **5.3**
                       Design User Interface

Responsibility: Project Team Analysts

Description: Design a user interface that is appropriate for the users, content, and operating
                       environment for the software product. Determine interface levels for all
                       categories of users. For interactive user environments, prototype the user
                       interface. Arrange for users to experiment with the prototypes so that design
                       weaknesses in the interface can be identified and resolved early. Use
                       prototypes to gain user acceptance of the interface.

                       If the site or system owner's organization has an existing user interface
                       standard, this standard should be used to specify the user interface for every
                       software product developed for that organization. A user interface standard
                       should be developed and maintained for each organization that does not have
                       one.

                       Review the standard each time a new software product is planned to verify that
                       the user interface is compatible with the software product's selected system
                       architecture. For example, some DOS-based user interface standards would not
                       be appropriate for a Windows-based software product.

                       The following tasks are involved in specifying the user interface.

                       5.3.1   Design Menu Hierarchy
                       5.3.2   Design Data Entry Screens
                       5.3.3   Design Display Screens
                       5.3.4   Design Online Help
                       5.3.5   Design System Messages

Basic Principles: The following basic principles can help improve the software product user
                       interface when there is graphical, command-based, menu-driven, or block
                       mode features.

                       •   Give users control. Let them choose actions to perform.

                       •   Give users feedback and progress reports. Tell them when the system is
                                working and when an action is completed.

                       •   Make sure programs, windows, and functions are consistent within and
                                with other components of the software product.

                       •   Be consistent in the format and wording of text.

Basic Principles,
continued:

- Keep it simple. White space is as important on the screen as on the printed page. Reduce screen clutter.

- Use special effects carefully and sparingly. Be sure color screens also work in one color--some users are colorblind, and some users have monochrome monitors. Use color consistently. Beeps and other sounds can be annoying; so let users turn sound off.

- Put information where it can be easily seen; avoid information in corners or borders.

- Limit the amount of information users must know. Offer choices instead of making users remember and enter information. Provide defaults, and make sure they are logical and satisfy a large number of users.

- Offer shortcuts. Keyboard shortcuts (e.g., hot keys) and command abbreviations help experienced users work more quickly.

- Help users get out of trouble. Provide messages that are understandable and that offer solutions.

- Let users reverse their actions. If an action will destroy something, identify the object of destruction and wait for a response.

Task: **5.3.1**
                   Design Menu Hierarchy

Description: Use the following guidelines to improve the design of menu hierarchies.

- Choose an organizing principle for the menu options, such as:

  - Expected frequency of use
  - Logical sequence of operations
  - Alphabetical order (should be used for horizontal word menus with five or more words)

- Put a meaningful title at the top of every menu.

- For full-screen menus, provide symmetric balance by centering the title and the menu options around the center axis of the screen.

- To facilitate scanning, put blank lines between logical groupings of menu options and after about every fifth option in a long list.

- Limit the number of menu choices to one screen.

- Use a menu option selection method that is consistent with the technology available at the user's workstation and the size of the software product being designed, such as:

  - Numbers
  - Letters or letter combinations
  - Cursor movement

- Provide a way for the user to leave the menu without performing any action. Be sure that the option to leave the menu describes the consequences of its selection.

- Words used for menu options should follow these rules:

  - Use words that clearly and specifically describe what the user is selecting.

  - Use common English words rather than computer or technical jargon. When space permits, spell out words completely.

Description,
continued: -   Use simple, active verbs to tell users what actions will result
                                    from their choice. Try to start each option with a verb.

                         -          Use parallel construction to describe the options.

             •   Minimize the highlighting used on a menu. Highlighting should be
                         limited to situations where the user needs to know that there is an
                         exception to the normal practice.

             •   Do not require the user to enter leading or trailing blanks or zeros, and
                         do not include a default value on a menu.

             •   Display the menu options in mixed letters (i.e., upper and lower case).

             •   Organize menu hierarchies according to the tasks users will perform,
                         rather than the structure of the software modules.

Work Product: Document the design for the menu hierarchy in accordance with the project
                     design standards. Discuss the design with the system owner and users and
                     submit the completed design for their review and approval. The approved
                     design will be incorporated into the Functional Design Document. Place a
                     copy of the menu hierarchy design in the Project File.

Review Process: Conduct a structured walkthrough to ensure that the menu hierarchy design is
                     complete and logical.

Task: **5.3.2**
                     Design Data Entry Screens

Description: Use the following guidelines to improve the design of data entry screens.

•   When the user must transcribe data directly from a source document to the screen, the layout of the screen should be similar to the layout of the source document.

•   Group data fields into logical categories on the screen; provide a header that describes the contents of each category.

•   Make areas of the screen that are not needed for data entry or commands inaccessible to the user.

•   Do not require the user to enter information that is already available to the software or can be computed by it.

•   Do not require the user to enter dimensional units, leading or trailing blanks, or zeros.

•   Allow the user to enter data by character replacement.

•   Put a caption describing the data to be entered adjacent to each data field; incorporate memory joggers into the caption.

•   Justify data entries automatically.

•   Display default values in data fields when appropriate.

•   Provide context-sensitive help for data entry fields.

Work Product: Document the designs for the data entry screens in accordance with the project design standards. Discuss the design with the system owner and users and submit the completed designs for their review and approval. The approved designs will be incorporated into the Functional Design Document. Place a copy of the data entry screen designs in the Project File.

Review Process: Conduct a structured walkthrough to assure that the data entry screen designs are consistent, complete, and logical.

Task: **5.3.3**
                             Design Display Screens

Description: Use the following guidelines to design display screens that are easy to use and
                             understand.

  •   Put a title on every display screen. The title should clearly and
          specifically describe the contents of the screen.

  •   Display only information that the user needs to know.

  •   Display data to the user in directly usable form.

  •   Provide symmetric balance to displays by centering titles and headings
          and by placing information on both sides of the center axis.

  •   Every display should indicate how to exit from the screen. Use
          consistent exit procedures.

  •   When the display continues over multiple screens, the screen should
          indicate where the user is in the display (e.g., Screen 1 of 3).

  •   Consider the skills of the users and the information they will manipulate
          when information is displayed in multiple windows.

  •   Data fields need to be grouped into logical categories or according to
          the structure of a source document (when there is one).

  •   Be consistent in the use of words and special characters.

  •   Display text conventionally in mixed letters (i.e., upper and lower case)
          and with appropriate punctuation. Avoid all uppercase letters. Put a
          blank line between paragraphs.

  •   Left justify text, and leave a ragged right margin.

  •   Avoid hyphenation of words between lines.

  •   Use abbreviations and acronyms only when they are significantly
          shorter than the full text and when they will be understood by the user.

  •   Be consistent with the format of information being displayed.

Table and List
Guidelines: Use the following guidelines to improve the design of online tables and lists.

- Put a meaningful label on the columns and, if appropriate, the rows of tables and lists. Continue the labels when a table or list extends over more than one screen.

- If data items are scrolled, the labels should be fixed on the screen and not be part of the scrolled area (they remain in place as the body of the table or list changes).

- If data items are continued on subsequent screens, the labels should be added to each screen.

- Arrange the items in a table or list in some recognizable order to facilitate scanning.

- Put items in a multiple column list in vertical columns that are read from left to right on the screen.

- Left justify columns of alphabetic data; right justify columns of numeric data or align them by the decimal point or other delimiter.

- Insert a blank line after about every fifth row in a long column.

- Insert a minimum of two spaces between the longest item in a column and the beginning of the next column.

- Start with a one (1) not a zero (0) when listed items are labeled by number.

Work Product: Document the design for the display screens in accordance with the project design standards. Discuss the designs with the system owner and users and submit the completed designs for their review and approval. The approved designs will be incorporated into the Functional Design Document. Place a copy of the display screen designs in the Project File.

Review Process: Conduct a structured walkthrough to ensure that the display screen designs are consistent, complete, and logical.

Task: **5.3.4**
                     Design Online Help

Description: Online help is typically requested by users when they want to perform a new,
                     complex, or infrequently used procedure, or when they do not know what else
                     to do. The text of online help messages needs to be planned, drafted, and
                     evaluated as carefully as print documentation. In addition, the layout and
                     format of online help must be designed to deal with the special constraints
                     imposed by the video screen.

                     Use online help to explain concepts, procedures, messages, menu choices,
                     commands, words, function keys, and formats. Work with the users to identify
                     the level of detail needed for online help. Determine whether the users need a
                     one-line message at the bottom of the screen or a full online explanation with
                     successive levels of detail.

                     Effective online help messages tell users what the software product is doing,
                     where they are in the sequence of screens, what options they have selected, and
                     what options are available.

Guidelines: The following guidelines can improve the design of online help.

                     •   Write online help messages in plain English.

                            -      Straightforward and reads as if it were spoken.
                            -      Clear, direct, and simple.
                            -      Effectively organized with a concern for what users need to
                                   know.

                     •   Address the user directly as "you"; use the active voice.

                     •   Use simple action verbs to describe procedures. Do not use nouns to
                            replace pronouns, verbs, and adjectives.

                     •   Describe procedures in logical order.

                     •   Avoid computer terms or other jargon, such as:

                            -      Terms that are unique to the computer profession or to a
                                   particular company.

                            -      Terms that have a common meaning outside of the data
                                   processing environment, but a special meaning within it, such as
                                   boot, *abort*, *default*, and *utility*.

Guidelines,
continued: -   Terms that are made up to describe some special function, such
                                         as *ungroup* and *dearchive*.

              •   Avoid humor in online documentation.

              •   Write in short complete sentences and paragraphs and use proper
                         punctuation.

              •   Write sentences in the positive or simple negative. Avoid the passive
                         voice and do not use double negatives.

              •   Use bullets, numbered lists, and tables to make it easier to find the most
                         important information. Leave ample open space.

                         -          Use bulleted lists to explain options. Whenever a sentence lists
                                    options with commas between them, consider breaking up the
                                    text into a bulleted list.

                         -          Use numbered lists to show the steps in a process.

                         -          Use a table to explain two or more categories of information.

              •   Use examples to show users what they should enter and what the results
                         will look like.

              •   Do not expect users to read more than about three screens of help at one
                         time.

              •   Provide an orientation to the structure of the software product.

              •   Whenever possible display help text on the screen with the function or
                         task that is being performed.

              •   Provide a direct route back to the function or task being performed.

Work Product: Document the design for online help in accordance with the project design
                      standards. Discuss the design with the system owner and users and submit the
                      completed design for their review and approval. The approved design will be
                      incorporated into the Functional Design Document. Place a copy of the online
                      help design in the Project File.

Review Process: Conduct a structured walkthrough to ensure that the online help design is
                      consistent, complete, and logical.

Task: **5.3.5**
                     Design System Messages

Description: System messages are the various types of information that the system provides
                     to the user such as status messages, user prompts, and error messages.

Status Messages: Status messages are important for giving users the feeling they are in control of
                     the software. They tell users what the software is doing, where they are in the
                     sequence of screens, what options they have selected, and what options are
                     available.

User Prompts: Prompts inform the user to type data or commands or to make a simple choice.

   •   Use prompts to ask the user to make a simple choice or to enter data or
            commands. Be as specific as possible.

   •   Include memory aids in the prompt to help users type a response in the
            proper format and order, initiate infrequently used processes, or clearly
            identify exceptions to normal practice.

   •   When defaults are allowed with prompts, indicate clearly which default
            value will be initiated.

Error Messages: Error messages should allow users to recover from mistakes by making it clear
                     what the mistake was and how to correct it. Error messages need to be specific
                     about why a mistake was made.

   •   Design the software product to check for obvious errors.

   •   Be as specific as possible in describing the cause of an error. Do not
            use error codes.

   •   Do not assign blame to the user or the software in an error message.
            Use a neutral tone.

   •   Whenever possible, the error message should indicate what corrective
            action the user needs to take.

   •   Be consistent in the format, wording, and placement of messages.

   •   Consider describing error messages at more than one level of detail.

Work Product: Document the design for the system messages in accordance with the project
design standards. Discuss the designs with the system owner and users and
submit the completed designs for their review and approval. The approved
designs will be incorporated into the Functional Design Document. Place a
copy of the system message designs in the Project File.

Review Process: Conduct a structured walkthrough to ensure that the system message designs
are consistent, complete, and logical.